

Tsunami deposits from Mochirippu and Kiritappu, eastern Hokkaido, northern Japan

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We identified twenty tsunami-origin sand sheets, probably generated with multi-segment interplate earthquakes at Kuril subduction zone, from a 4-m sliced sample at Mochirippu and Kiritappu.

Interplate earthquakes have repeated along the Kuril trench off eastern Hokkaido. Hokkaido is on a continental plate that is being subducted by the Pacific plate at a rate of 8-9 cm/yr. Recent and historical tsunamis along the coast are typically generated from interplate earthquakes with rupture length of 100-200 km. Such earthquakes at the interval of about 100 years, usually with independent rupture zones, have been regarded characteristics of the southern Kuril subduction zone. In a recent study, however, infrequent occurrence of earthquakes generated from longer ruptures (200-300 km) than usual earthquakes was inferred from tsunami deposits and simulations (multi-segment earthquake; Nanayama et al., 2003 in *Nature*, 424, 660).

The study site, Mochirippu, records twenty tsunami-origin sand sheets interbedded with massive mud and peat. The whole sequence of mud, peat, tsunami sand was seen in a single core, obtained by a geoslice sampler. We attributed the sand sheets to large tsunamis based mainly on geomorphological setting and detailed sedimentological characteristics. There are three possibilities to leave sand sheets on the coast; fluvial depositions, storms, and tsunamis. The absence of large river inflow into Mochirippu removes fluvial deposition as a possible origin for sand sheets in this site. Also storm surges for the sand sheets are unlikely than a tsunami origin because the Mochirippu is protected by sand barrier and connected to the sea via shallow and narrow inlet. The current velocities through this narrow entrance during a storm surge are not likely to be strong enough to transport sand and gravel throughout the Mochirippu. Thus we concluded that the sand sheets were attributed to historical and prehistoric tsunamis. On the basis of the same view, we attributed fourteen sand sheets interbedded with peat to tsunami-origin in Kiritappu.

Plant macrofossils and charred materials provide ages of the tsunamis. We picked up plant macrofossils and charred materials above/below the tsunami deposits to date radiocarbon ages, and estimated the ages of tsunami deposits using calibration program Oxcal 4.0.